IS 6834-2 (1976): Specification for Conveyor Chains, Chain-wheels and Attachments, Part II: Chain-wheels [MED 6: Continuous Bulk Conveying, Elevating, Hoisting Aerial Ropeways and Related Equipment]
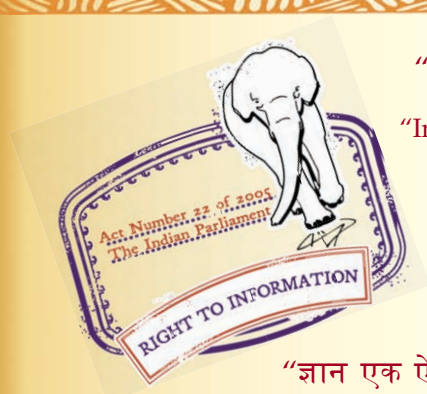
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Indian Standard

SPECIFICATION FOR
CONVEYOR CHAINS, CHAIN-WHEELS AND ATTACHMENTS
PART II CHAIN-WHEELS

1. Scope — Lays down the requirements for chain-wheels associated with chains used for conveyors.

2. Nomenclature — Shall be as given in Fig. 1.

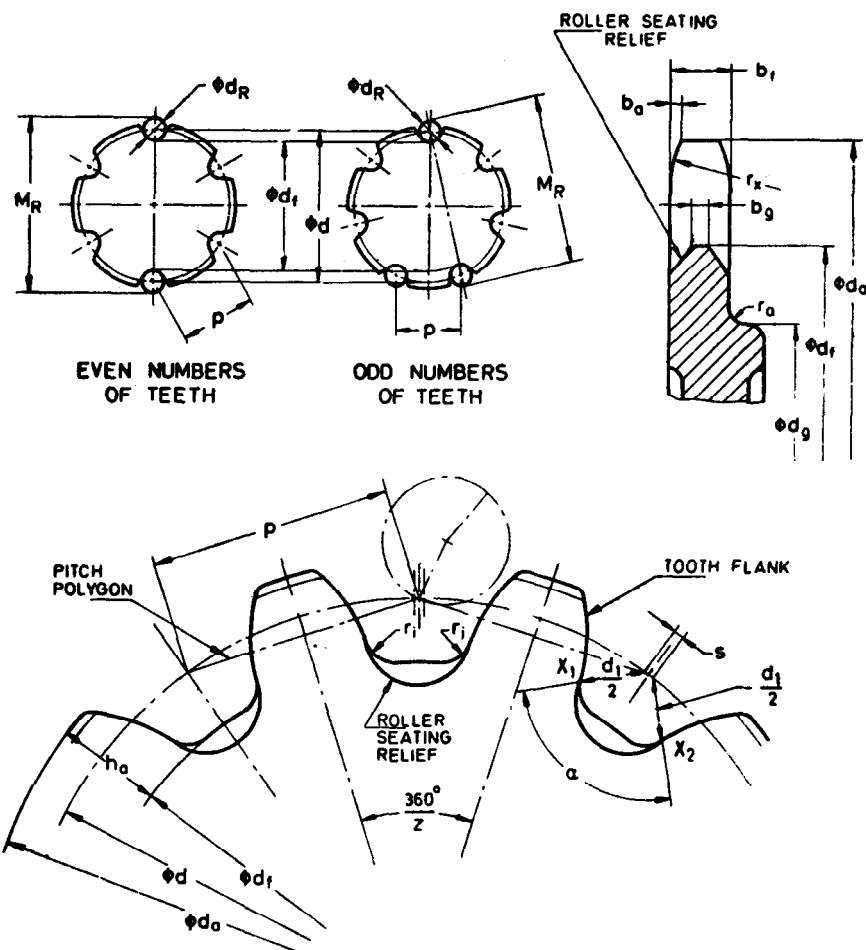|	
b_a = tooth side relief	h_a = tooth height above bottom diameter
b_t = tooth width	M_R = measurement over measuring pins
b_g = relieved tooth width, minimum	p = chordal pitch and is equal to chain pitch
d = pitch circle diameter	r_a = shroud radius
d_a = tip diameter	r_i = roller seating radius
d_f = root diameter	r_x = minimum tooth side radius
d_g = absolute maximum shroud diameter	s = pitch line clearance
d_R = measuring pin diameter	z = number of teeth
d_1 = plain roller diameter, maximum	α = roller seating angle
d_2 = bearing pin diameter	

FIG. 1 NOMENCLATURE FOR CHAIN-WHEELS

3. Material — The manufacturing material of the chain-wheels shall be selected to suit design. The suitable materials are grey cast iron conforming to Grade 25 (or superior grade) of IS : 210-1970 ' Specification for grey iron castings (*second revision*), cast steel or alloy steel with necessary heat treatment as required for the duty conditions.

4. Teeth

4.1 Chain-wheels shall be provided with teeth in accordance with 5 which specifies control criteria to ensure correct meshing, operating and transmission of load given under normal operating conditions. The controls do not necessarily determine the design parameters of conveyor chain-wheels.

4.2 *Preferred Tooth Range* — The requirements laid down in the standard apply to chain-wheels having teeth from 6 to 40. The following shall be the preferred number of teeth:

8, 10, 12, 16 and 24.

5. Dimensions

5.1 *Diametral Dimensions*

5.1.1 *Tip diameter* — The maximum recommended tip diameter is 3 000 mm.

5.1.2 *Measuring pin diameter* — Measuring pin diameter $d_R = d_1$ (or d_4 or d_7 as appropriate) subject to tolerance $h11$ of IS : 919-1963 ' Recommendations for limits and fits for engineering '.

5.1.3 *Pitch circle diameter* — Pitch circle diameter $d = p \ \text{cosec} \ \dfrac{180°}{Z}$ (*See* Appendix A for nominal dimensions of the normal range of teeth).

5.1.4 *Root diameter* — Root diameter d_t Max $= d - d_1$ (or $d - d_4$, or $d - d_7$ as appropriate) subject to limits of tolerance as follows:

Tooth Form	Upper Deviation	Lower Deviation
As cast	0	$0.0043 \ d_t + 2.6$ up to a maximum deviation of 11 mm
Machine-cut	0	$0.000\ 21 \ d_t + 0.5$ up to a maximum deviation of 0.8 mm

5.1.5 *Measurement over measuring pins* — For even number of teeth $M_R = d + d_R$.

For odd number of teeth $M_R = d \ \cos \dfrac{90°}{Z} + d_R$.

Note 1 — For a wheel having an even number of teeth, measurement is made over pins inserted in diametrally opposed tooth spaces. For a wheel having an odd number of teeth, measurement is made over pins inserted in tooth spaces most nearly diametrally opposite. During measurement, the pins should always be in contact with corresponding working faces of the respective teeth.

Note 2 — The limits of tolerance for the measurement over pins are identical for those according to the corresponding root diameter.

5.2 *Tooth Form and Dimensions (Cast Teeth)* — The wheel tooth gap is defined taking the following criteria into consideration.

5.2.1 *Working face* — The working face is the functional part of the tooth form. It is the area which lies between the lines of contact of two rollers, the centre line of one lying on the pitch circle and the centre line of the other lying on a circle of diameter equal to

$$(p + 0.25 \ d_2) \ \text{cosec} \ \frac{180°}{Z}$$

unless reduced due to limitations imposed by having all lines perpendicular to the tooth form pass inside the adjacent pitch point on the pitch circle.

The working face may be straight or convex.

5.2.2 *Pressure angle* — The angle between the pitch line of the chain link and the line perpendicular to the working face at the point of roller contact. The pressure angle at any point of the working face shall be as follows:

Number of Teeth Z	Pressure Angle Degrees	
	Min	Max
6—7	7	10
8—9	9	12
10—11	12	15
12—13	14	17
14—15	16	20
16—19	18	22
20—27	20	25
28 and above	23	28

5.2.3 *Tooth height* — When attachments bridge the chain link, the tip of the tooth shall not project above the chord of pitch circle by an amount greater than $0.8\, h_4$.

Note — h_4 = platform height of k attachments [see IS : 6834 (Part III)-1976 Conveyor chains, chain-wheel and attachment: Part III Attachments].

5.2.4 *Minimum pitch line clearance* — Minimum clearance, $s = 0.04\, p$ (for as cast teeth) or $0.08\, d_1$ (for machine-cut teeth).

5.2.5 *Maximum roller seating radius* — Maximum roller seating radius

$$r_1\, Max = \frac{d_1}{2}\ (\text{or}\ \frac{d_4}{2}\ \text{or}\ \frac{d_7}{2}\ \text{as appropriate})$$

5.2.6 *Tooth flank*

5.2.6.1 Regardless of the size of the seating radius or whether a straight or curved tooth form is employed, it is essential to achieve clearance at points x_1 and x_2 of $\frac{d_1}{2}$ (or $\frac{d_4}{2}$ or $\frac{d_7}{2}$ as appropriate) between the pitch line clearance dimension lines and the tooth flank measured along the seating angle dimension lines.

5.2.6.2 Minimum clearance between tooth tip and roller track shall be $0.06\, d_1$ in all cases including wheels for bush and for small roller chains.

5.3 *Tooth Dimensions and Proportions (Machine-Cut Teeth)* — The basic dimensions and proportions as specified in **5.1** are applicable. It may be noted that the finer tolerances than for 'as cast' teeth are specified against certain dimensions and these tolerances are given in the appropriate clauses of this standard.

5.4 *Dimensions of Wheel Rim Profile*

5.4.1 *Tooth width* — For bush, small and plain roller chains:

$$b_t\, Max = 0.9\, b_1 - 1\ \text{mm}$$
$$b_t\, Min = 0.87\, b_1 - 1.7\ \text{mm}$$

For flanged roller chains:

$$b_t\, Max = 0.9\, (b_1 - b_{11}) - 1\ \text{mm}$$
$$b_t\, Min = 0.87\, (b_1 - b_{11}) - 1.7\ \text{mm}$$

5.4.2 *Minimum tooth side radius* — $r_x = 1.6\, b_1$

5.4.3 *Tooth side relief* — $b_a = 0.16\, b_1$

5.4.4 *Minimum relieved tooth width* — $b_g = 0.25\, b_t$

Note — Under some conditions of use the material being conveyed may build up in the space between the roller and the tooth and to prevent malfunctioning it is permissible to relieve the roller seating as shown in Fig. 1.

5.4.5 *Shroud radius* — r_a at the discretion of manufacturer.

5.4.6 *Maximum shroud diameter* — $d_g = p \cot \dfrac{180°}{Z} - h_2 - 2r_a$

5.5 *General Limits of Tolerance*

5.5.1 *Bore diameter* — Unless otherwise agreed upon between purchaser and manufacturer, bores shall conform to H9 of IS : 919-1963.

5.5.2 *Radial run-out* — The radial run-out between the bore and the root diameter shall not exceed a value for total indicator reading derived from:

for 'as cast' teeth $0.005\, d_t$ or 1.5 mm, whichever is the greater;
for 'machine-cut' teeth $0.001\, d_t + 0.1$ mm or 0.2 mm whichever is the greater.

Radial run-out for machine-cut teeth shall in no case exceed 2 mm.

5.5.3 *Axial run-out* — The axial run-out measured with reference to the bore and the flat part of the side face of the teeth shall not exceed the same values for total indicator readings as given in **5.5.2**.

5.5.3.1 Axial run-out for machine-cut teeth shall in no case exceed 2 mm.

6. Keyways — The provision of keyways shall be the subject of agreement between the purchaser and the manufacturer. In case keyways are provided they shall conform to IS : 2048-1975 'Specification for parallel keys and keyways (*first revision*)'.

7. Marking — Chain-wheels shall be marked with manufacturer's name and/or trade-mark; the number of teeth and the appropriate chain number for which the chain-wheel is suitable.

7.1 *Certification Marking* — Details available with the Bureau of Indian Standards.

APPENDIX A

(*Clause* 5.1.3)

PITCH CIRCLE DIAMETERS

The following table gives correct pitch circle diameters for chain-wheels to suit a chain of unit pitch. The pitch circle diameters for wheels to suit a chain of any other pitch are directly proportioned to the pitch of the chain:

Number of Teeth	Pitch Circle Diameter	Number of Teeth	Pitch Circle Diameter	Number of Teeth	Pitch Circle Diameter
5	1·701 3	17	5·442 2	29	9·249 1
5 1/2	1·849 6	17 1/2	5·600 5	29 1/2	9·408 0
6	2·000 0	18	5·758 8	30	9·566 8
6 1/2	2·151 9	18 1/2	5·917 1	30 1/2	9·725 6
7	2·304 8	19	6·075 5	31	9·884 5
7 1/2	2·458 6	19 1/2	6·234 0	31 1/2	10·043 4
8	2·613 1	20	6·392 5	32	10·202 3
8 1/2	2·768 2	20 1/2	6·550 9	32 1/2	10·361 2
9	2·923 8	21	6·709 5	33	10·520 1
9 1/2	3·079 8	21 1/2	6·868 1	33 1/2	10·679 0
10	3·236 1	22	7·026 6	34	10·838 0
10 1/2	3·392 7	22 1/2	7·185 3	34 1/2	10·996 9
11	3·549 4	23	7·343 9	35	11·155 8
11 1/2	3·706 5	23 1/2	7·502 6	35 1/2	11·314 8
12	3·863 7	24	7·661 3	36	11 473 7
12 1/2	4·021 1	24 1/2	7·820 0	36 1/2	11·632 7
13	4·178 6	25	7·978 7	37	11·791 6
13 1/2	4·336 2	25 1/2	8·137 5	37 1/2	11·950 6
14	4·494 0	26	8·296 2	38	12·109 5
14 1/2	4·651 8	26 1/2	8·455 0	38 1/2	12·268 5
15	4·809 7	27	8·613 8	39	12·427 5
15 1/2	4·967 7	27 1/2	8·772 6	39 1/2	12·586 5
16	5·125 8	28	8·931 4	40	12·745 5
16 1/2	5·284 0	28 1/2	9·090 2		

EXPLANATORY NOTE

This standard is in conformity with ISO 1977/II-1974 'Conveyor chains, attachments and chain wheels — Part II Chain wheels' issued by International Organization for Standardization. Other standards in this series are:

IS : 6834 (Part I)-1973 Specification for conveyor chains, chain-wheels and attachments: Part I Chains

IS : 6834 (Part III)-1976 Specification for conveyor chains, chain-wheels and attachments: Part III Attachments

While preparing this standard assistance has been taken from BS 4116 : 1971 'Specification for steel roller chains, chainwheels and attachments for conveyors' issued by the British Standards Institution.